

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today was **not** written for publication in a law journal and is **not** binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIDEKI KOIKE, SATOSHI SHIMADA, AKIRA TOMONO,
KENICHIRO ISHII and TOSHIKI ISO

Appeal No. 1998-0618
Application 08/288,194

ON BRIEF

Before HAIRSTON, FLEMING, and HECKER, ***Administrative Patent Judges.***

HECKER, ***Administrative Patent Judge.***

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 6, 7, 9, 11, 12, 14, 19, 20, 22, 23, 24, 26, 28, 29 and 32 through 37, all claims pending in this application at the time. Appellants have subsequently

canceled claims 6, 20, 22 and 26¹. The Examiner has subsequently withdrawn the rejection of claims 7, 9, 11, 12, 14, 19, 23, 24, 28 and 29². Thus, the remaining claims under rejection are claims 32 through 37, being all the independent claims in this application.

The invention relates to a method and apparatus for automatically identifying persons by comparing an image of the face of such a person with a dictionary or library of images previously generated. The library images are taken from different angular directions, with the angle between two adjacent directions being equal to or greater than 10E, but no greater than 40E. In addition to the 10E/40E angular aspect, different embodiments include mosaic processing, normalization of intensity, and geometrical transform of matching regions.

Representative independent claim 32 is reproduced as follows:

32. A method for detecting a face image in an input test image as a face region by matching each of successive

¹Note page 2 of the brief.

²Note page 2 of the answer.

regions of said input test image with dictionary images I_{Dn} which are produced from images obtained by taking images of reference faces belonging to L categories from predetermined M directions, where L is an integer equal to one or greater, M is an integer equal to two or greater and is so selected that an angle between two adjacent directions from which images of said references faces are taken is equal to or greater than 10° and no greater than 40° , and $n=1, 2, \dots, N$, and $N=LXM$, said method comprising the steps of:

(a) updating a matching position (X, Y) of said input test image and outputting said updated matching position (X, Y);

(b) cutting out, as a matching region image, an image of a region of a predetermined size on the basis of said matching position (X, Y) in said input test image;

(c) computing a degree of similarity $r(n)$ between said matching region image and an n-th dictionary image;

(d) repeating the computation of said degree of similarity $r(n)$ with said matching position (X, Y) and said n varied thereby obtaining the degree of similarity $r(n)$ between said matching region image and each of respective dictionary images of said L categories and M directions;

(e) detecting said face region in said test image by obtaining the matching position where said degree of similarity obtained by said step (d) becomes the maximum as a face position (X_{max} , Y_{max}); and

(f) comparing said degree of similarity $r(n)$ with a predetermined threshold value to determine, based on the comparison, whether or not the face image in said test image belongs to at least one of said categories;

wherein each said dictionary image is generated as a series of dictionary block image information consisting of q

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pieces of block image information, each composed of a representative pixel value of a corresponding one of q blocks obtained by dividing the matching region in the image of said reference face into w pieces in a longitudinal direction and v pieces in a lateral direction, where $q=vxw$, and wherein said step of computing the degree of similarity is a step of generating a series of test block image information consisting of q pieces of block information, each composed of a representative pixel value of a corresponding one of q blocks obtained by dividing said matching region at the matching position (X, Y) in said test image into w pieces in the longitudinal direction and v pieces in the lateral direction and computing the degree of similarity between the series of test block image information and the n -th series of dictionary block image information as the degree of said similarity $r(n)$.

The Examiner relies on the following references:

Rothfjell	3,805,238	Apr. 16, 1974
Kado et al.	5,410,609	Apr. 25, 1995 (filed Aug. 7, 1992)

Claims 32 through 37 stand rejected under 35 U.S.C.

§ 103(a) as being unpatentable over Kado in view of Rothfjell.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the brief and answer for the respective details thereof.

OPINION

After a careful review of the evidence before us, we

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will not sustain the rejection of claims 32 through 37 under 35 U.S.C. § 103.

The Examiner has failed to set forth a ***prima facie*** case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the reasonable teachings or suggestions found in the prior art, or by a reasonable inference to the artisan contained in such teachings or suggestions.

In re Sernaker, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." ***Para-Ordnance Mfg. v. SGS Importers Int'l, Inc.***, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995) (***citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.***, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984)).

The Examiner reasons that Kado teaches the claimed invention except for "taking images of reference faces in M directions wherein M is an integer equal to two or greater and

is so selected that an angle between two adjacent directions from which images of the references faces are taken is equal to or greater than 10 degrees and no greater than 40 degrees." (Answer-pages 4 and 5.)

The Examiner notes that Rothfjell teaches capturing reference faces, from one on up, at different angles depending on different specific embodiments. Thus, the Examiner contends,

[I]t would have been obvious to one skilled in the art at the time the invention was made to capture such reference faces at different angles in Kado's system to derive different and distinguishable characteristics, from more than one view, for accurate recognition as taught by Rothfjell. Because the identification becomes more accurate with an increased number of images, it is clear that an increased number of images reduces the relative angle between them. Therefore, Rothfjell suggests that additional images (along with corresponding reduced angles) would provide better identification, so that one of ordinary skill would have found it obvious to utilize a larger number of images. Absent any teaching or criticality, providing the images are captured at different angles is a matter of design choice as it is taught by Rothfjell that any number of images can be captured, from one on up, depending on a specific embodiment. (Answer-page 5.)

Appellants argue that an important feature of their

claimed invention is the 10E/40E angular interval aspect, and that this aspect is recited in all independent claims (brief-page 15). We note that the Examiner acknowledges Kado does not mention image direction or angular interval aspect. Appellants also argue that Rothfjell does not teach or suggest the claimed 10E/40E angular interval aspect, that Rothfjell's 0E, 45E and 90E teaches away from Appellants' 10E/40E angular aspect, and that the Examiner has used improper hindsight to revise Rothfjell. (Brief-pages 15 and 16.)

We agree with Appellants. At first blush, the Examiner's position seems logical. The Examiner notes that Rothfjell teaches any number of images can be captured, "from one on up", and that identification becomes more accurate with an increased number of images. If the number of images were increased, the logical result would be reduced angles. As we note, this would reduce Rothfjell's 45E angle to something less, easily within Appellants' claimed 40E. (Answer-page 7.)

However, upon closer inspection, this logic does not hold water. First, neither Rothfjell nor Kado states that

more images provide more accuracy. Rothfjell states "**any number** of such photographs (from one on up) **may be sufficient** in various embodiments" (column 3, lines 40-42, emphasis added). Thus, "any number" can be 1 as well as the more than 3 required by the Examiner's logic. There is no suggestion that more (greater than 3) is better. Rothfjell only states that a different number "may be sufficient". The only suggestion that more is better comes from Appellants' disclosure.

Second, assuming the number of photographs is increased in Rothfjell, there is no suggestion that these would be taken between the suggested 0E, 45E and 90E disclosed, resulting in 0E, 22.5E, 45E, 67.5E and 90E, and thus within Appellants' claimed 40E. One could just as easily take the additional photographs at 0E, 45E, 90E, 135E, 180E, etc., and thus still exceed Appellants' claimed 40E.

Third, assuming the photograph angles were a matter of design choice (answer-page 5), why would one skilled in the art decide to decrease Rothfjell's angle size to less than 45E instead of increasing the angle size. And, if somehow one

were to decide to decrease Rothfjell's 45E angle, why would one stop at 10E. Nothing in Rothfjell (nor Kado) suggests additional photographs at decreased angles, nor a lower limit of the claimed 10E. Only Appellants' disclosure makes these suggestions.

The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." ***In re Fritch***, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), ***citing In re Gordon***, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." ***Para-Ordnance Mfg. v. SGS Importers Int'l***, 73 F.3d at 1087, 37 USPQ2d at 1239, ***citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.***, 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-13.

As pointed out above, there is no teaching or suggestion of record to take images at the claimed 10E/40E

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angular interval aspect. Since the 10E/40E angular interval aspect is recited in all rejected claims, we need not comment on Appellants' additional arguments. Thus, we will not sustain the Examiner's rejection of any claims.

We have not sustained the rejection of claims 32 through 37 under 35 U.S.C. § 103. Accordingly, the Examiner's decision is reversed.

REVERSED

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
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MICHAEL R. FLEMING)	
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